

# **EXHIBIT 2**

**UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION**

LEAGUE OF WOMEN VOTERS	)	
OF MICHIGAN, et al.,	)	Case No. 2:17-cv-14148
	)	
Plaintiffs,	)	Hon. Eric L. Clay
	)	Hon. Denise Page Hood
	)	Hon. Gordon J. Quist
v.	)	
	)	<b>DECLARATION OF</b>
	)	<b>JOWEI CHEN</b>
RUTH JOHNSON, in her official	)	
Capacity as Michigan	)	
Secretary of State, et al.,	)	
	)	
Defendants.	)	

I, Jowei Chen, declare under penalty of perjury and pursuant to 28 U.S.C.

§ 1746, as follows:

1. I am over 18 years of age and competent to testify.
2. I have personal knowledge of the matters set forth below.
3. I am an Associate Professor in the Department of Political Science at the University of Michigan, Ann Arbor.
4. I am also a Faculty Associate at the Center for Political Studies of the Institute for Social Research at the University of Michigan as well as a Research Associate the Spatial Social Science Laboratory at Stanford University.
5. In 2007, I received a M.S. in Statistics from Stanford University, and in 2009, I received a Ph.D. in Political Science from Stanford University.

6. My research has been published in The American Journal of Political Science, The American Political Science Review, and Election Law Journal. I have presented my research at invited talks and academic conferences hosted by leading universities and political science associations. A true and accurate copy of my curriculum vitae is attached hereto as Exhibit A.

7. My academic areas of expertise include legislative elections, spatial statistics, geographic information system (GIS) data, redistricting, racial politics, legislatures, and political geography. I have unique expertise in the use of computer simulations of legislative districting and to study questions related to political geography and redistricting.

8. As of the date of my June 1, 2018 report, I had provided expert reports in the following redistricting court cases: Missouri National Association for the Advancement of Colored People v. Ferguson-Florissant School District and St. Louis County Board of Election Commissioners (E.D. Mo. 2014); Rene Romo et al. v. Ken Detzner et al. (Fla. 2d Judicial Cir. Leon Cnty. 2013); The League of Women Voters of Florida et al. v. Ken Detzner et al. (Fla. 2d Judicial Cir. Leon Cnty. 2012); Raleigh Wake Citizens Association et al. v. Wake County Board of Elections (E.D.N.C. 2015); Corrine Brown et al. v. Ken Detzner et al. (N.D. Fla. 2015); City of Greensboro et al. v. Guilford County Board of Elections, (M.D.N.C. 2015); Common Cause et al. v. Robert A. Rucho et al. (M.D.N.C. 2016); League of Women Voters of Pennsylvania et

al. v. Commonwealth of Pennsylvania et al. (No. 261 M.D. 2017); Georgia State Conference of the NAACP et al v. The State of Georgia et al. (N.D. Ga. 2017). I have testified at trial in the following cases: Raleigh Wake Citizens Association et al. v. Wake County Board of Elections (E.D.N.C. 2015); City of Greensboro et al. v. Guilford County Board of Elections (M.D.N.C. 2015); Common Cause et al. v. Robert A. Rucho et al. (M.D.N.C. 2016); League of Women Voters of Pennsylvania et al. v. Commonwealth of Pennsylvania et al. (No. 261 M.D. 2017).

9. On June 1, 2018, I submitted an expert report in this case. (Dkt. 129-51.) My report addressed a research question I was asked to answer by the Plaintiffs' attorneys—whether Michigan's current House, Senate and Congressional districting plans have the effect of producing an extreme partisan outcome that diverges from possible alternative maps. To answer this question, I developed computer simulation programming techniques that allow me to produce a large number of non-partisan districting plans that adhere to traditional districting criteria. The computer simulation programming was prepared using Java, a programming language that instructs a computer to run algorithms.

10. To perform the computer simulations for this case, I wrote Java code using editing software. Java code is a set of instructions that are written in the Java programming language. Java code can be saved in a .java computer file format. A .java file can be converted into a .jar file.

11. During 2016 and 2017, I wrote the Java code that generated the simulated districts for the State of Michigan and described in my expert report. As I refined and improved my simulation algorithm, I made edits to the Java code. Every time the working Java code was edited, it would replace the existing draft of the Java code, unless I intentionally saved a version elsewhere. The editing software does not “autosave,” in that it does not store separate versions of the Java code under different file names after edits are made. I would often save a version of the Java code separate from the working Java code when I made significant changes to the working Java code.

12. I saved a draft of the Java code used in this case in 2017 or earlier because I had finished making significant changes to it. After this time, I may have continued to make cosmetic changes to the Java code, but I did not make any significant changes for the Java code I wrote for my expert report in this case. I did not save any other later versions of the Java code after that for the purpose of my expert report for this case. The cosmetic changes included deleting functions that were unnecessary because, for example, they were redundancy checks I had earlier included to verify that the algorithm was functioning as intended.

13. For instance, I originally programmed multiple methods for analyzing district compactness, but in the final version of the Java code, I only kept the most computationally efficient method of analyzing compactness. It is my understanding

that redundancy checks slow down the program computation process so once I verified that the algorithm was indeed functioning, I omitted those redundancy checks before using the program to run a large number of simulated districts and maps.

14. I used a high-capacity server computer to run these simulations, and I do not know whether or how my programs would run on smaller desktops or laptops.

15. As part of the cosmetic changes I made to the Java code, I did not change any “output limitations” concerning the permissible number of county or MCD breaks. Rather, I recall that I had already written Java code that sought to reduce the number of county breaks under a particular numerical, target threshold. To the best of my recollection, I did not make any further changes to this function after I saved the earlier draft Java code that was produced to the Defendant. The final Java code, which I used to generate the simulated districts and upon which I relied to draft my June 1, 2018 expert report, was complete by mid-2017 or earlier.

16. I did save a final version of the .jar files that were used to create all the simulations in my report.

17. In June 2018, I produced a copy of the final version of the .jar files to the Plaintiffs’ counsel, so that they could produce it to the Defendant in this case. Before turning over these .jar files, I recall renaming them to mark them as “CONFIDENTIAL INFORMATION.” I would have marked the files in this way because I understood that the stipulated confidentiality order in this case allowed for

expert materials to be marked in this way. It is part of my normal practice to rename .jar files by re-running them through a Java compiler. It is also part of my normal practice to re-run .jar files through a compiler for the purpose of checking errors and/or code optimization. In light of this normal practice, I believe I re-ran the final version of the .jar files through a compiler just before turning them over in June 2018.

18. Because all the files I produced to the Plaintiffs' counsel were so large, I also compressed the files into two .zip files to make them shareable. On June 13, 2018, I sent a copy of the two .zip files to the Plaintiffs' counsel through a secure file transfer service.

19. The Defendant has the very computer code used to prepare my expert report.

20. I did not "delete" the final Java code or .java files that were used to generate the simulated districts. In mid-2017 or earlier, when I completed editing the Java code, I converted it into .jar files and saved them separately. I used these .jar files to create my expert report. These .jar files were later produced to the Defendant. After I saved these .jar files in mid-2017 or earlier, I recall using the .java files, from which the .jar files are based, as a starting point to create new Java code with different parameters to run simulated districts for research regarding other states. The changes I made to account for the different parameters needed for this other research would have replaced the code in the final Michigan .java files.

21. As my June 1, 2018 report details, after running the programs I developed for this case, I found that each of the Michigan enacted plans was a partisan outlier when compared to the computer-simulated plans. Specifically, each of the three enacted plans creates more Republican districts than every single one of the 1,000 computer-simulated districting plans created for Michigan's House, Senate, and Congressional delegation.

22. In Jeffrey Timmer's December 4, 2018 declaration critiquing my expert report, he notes that the Defendant instructed him to draw a plan to ensure that 9 or more Republicans were elected. (Dkt. 147-6 ¶ 14.) However, to draw district lines following this instruction is a form of partisan gerrymandering. The 1,000 simulated districts that resulted from my algorithm did not produce the same politically biased plan that Timmer intentionally created precisely because my algorithm excludes the very partisan instruction that Timmer used in creating his plan.

23. My algorithm does not reject maps because they are favorable for Republicans or for Democrats. The enacted maps are partisan biased; my simulations are not.

24. I wrote code that directed the algorithm to maximize compactness for all districts, in addition to the other criteria described in my report. Valuing compactness is a traditional criterion in re-districting.



I declare under the penalty of perjury under the laws of the United States of America that the foregoing is all true and correct.

December 10, 2018

\_\_\_\_\_  
Date

  
\_\_\_\_\_

## Exhibit A

**Jowei Chen**  
**Curriculum Vitae**

Department of Political Science  
University of Michigan  
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505 South State Street  
Ann Arbor, MI 48109-1045  
Phone: 917-861-7712, Email: [jowei@umich.edu](mailto:jowei@umich.edu)  
Website: <http://www.umich.edu/~jowei>

**Academic Positions:**

Associate Professor (2015-present), Assistant Professor (2009-2015), Department of Political Science, University of Michigan.  
Faculty Associate, Center for Political Studies, University of Michigan, 2009 – Present.  
W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2013.  
Principal Investigator and Senior Research Fellow, Center for Governance and Public Policy Research, Willamette University, 2013 – Present.

**Education:**

Ph.D., Political Science, Stanford University (June 2009)  
M.S., Statistics, Stanford University (January 2007)  
B.A., Ethics, Politics, and Economics, Yale University (May 2004)

**Publications:**

- Chen, Jowei and Neil Malhotra. 2007. "The Law of k/n: The Effect of Chamber Size on Government Spending in Bicameral Legislatures."  
[\*American Political Science Review\*. 101\(4\): 657-676.](#)
- Chen, Jowei, 2010. "The Effect of Electoral Geography on Pork Barreling in Bicameral Legislatures."  
[\*American Journal of Political Science\*. 54\(2\): 301-322.](#)
- Chen, Jowei, 2013. "Voter Partisanship and the Effect of Distributive Spending on Political Participation."  
[\*American Journal of Political Science\*. 57\(1\): 200-217.](#)
- Chen, Jowei and Jonathan Rodden, 2013. "Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures"  
[\*Quarterly Journal of Political Science\*, 8\(3\): 239-269.](#)
- Bradley, Katharine and Jowei Chen, 2014. "Participation Without Representation? Senior Opinion, Legislative Behavior, and Federal Health Reform."  
[\*Journal of Health Politics, Policy and Law\*. 39\(2\), 263-293.](#)
- Chen, Jowei and Tim Johnson, 2015. "Federal Employee Unionization and Presidential Control of the Bureaucracy: Estimating and Explaining Ideological Change in Executive Agencies."  
[\*Journal of Theoretical Politics\*, Volume 27, No. 1: 151-174.](#)

Bonica, Adam, Jowei Chen, and Tim Johnson, 2015. "Senate Gate-Keeping, Presidential Staffing of 'Inferior Offices' and the Ideological Composition of Appointments to the Public Bureaucracy."

*Quarterly Journal of Political Science*. Volume 10, No. 1: 5-40.

Chen, Jowei and Jonathan Rodden, 2015. "Redistricting Simulations and the Detection Cutting through the Thicket: of Partisan Gerrymanders."

*Election Law Journal*. Volume 14, Number 4: 331-345.

Chen, Jowei and David Cottrell, 2016. "Evaluating Partisan Gains from Congressional Gerrymandering: Using Computer Simulations to Estimate the Effect of Gerrymandering in the U.S. House."

*Electoral Studies*. Volume 44 (December 2016): 329-340.

Chen, Jowei, 2017. "Analysis of Computer-Simulated Districting Maps for the Wisconsin State Assembly."

*Forthcoming 2017, Election Law Journal*.

#### **Non-Peer-Reviewed Publication:**

Chen, Jowei and Tim Johnson. 2017. "Political Ideology in the Bureaucracy."

*Global Encyclopedia of Public Administration, Public Policy, and Governance*.

Chen, Jowei. October 4, 2017. Time Magazine Op-Ed.

<http://time.com/4965673/wisconsin-supreme-court-gerrymandering-research/>

Chen, Jowei and Jonathan Rodden. January 2014. New York Times Op-Ed.

<https://www.nytimes.com/2014/01/26/opinion/sunday/its-the-geography-stupid.html>

#### **Research Grants:**

Principal Investigator. [National Science Foundation Grant SES-1459459](#), September 2015 – August 2018 (\$165,008). "The Political Control of U.S. Federal Agencies and Bureaucratic Political Behavior."

"Economic Disparity and Federal Investments in Detroit," (with Brian Min) 2011. Graham Institute, University of Michigan (\$30,000).

"The Partisan Effect of OSHA Enforcement on Workplace Injuries," (with Connor Raso) 2009. John M. Olin Law and Economics Research Grant (\$4,410).

#### **Invited Talks:**

September, 2011. University of Virginia, American Politics Workshop.

October 2011. Massachusetts Institute of Technology, American Politics Conference.

January 2012. University of Chicago, Political Economy/American Politics Seminar.

February 2012. Harvard University, Positive Political Economy Seminar.

September 2012. Emory University, Political Institutions and Methodology Colloquium.

November 2012. University of Wisconsin, Madison, American Politics Workshop.

September 2013. Stanford University, Graduate School of Business, Political Economy Workshop.

February 2014. Princeton University, Center for the Study of Democratic Politics Workshop.

November 2014. Yale University, American Politics and Public Policy Workshop.

December 2014. American Constitution Society for Law & Policy Conference: Building the Evidence to Win Voting Rights Cases.  
February 2015. University of Rochester, American Politics Working Group.  
March 2015. Harvard University, Voting Rights Act Workshop.  
May 2015. Harvard University, Conference on Political Geography.  
October 2015. George Washington University School of Law, Conference on Redistricting Reform.  
September 2016. Harvard University Center for Governmental and International Studies, Voting Rights Institute Conference.  
March 2017. Duke University, Sanford School of Public Policy, Redistricting Reform Conference.  
October 2017. Willamette University, Center for Governance and Public Policy Research  
October 2017, University of Wisconsin, Madison. Geometry of Redistricting Conference.

**Conference Service:**

Section Chair, 2017 APSA (Chicago, IL), Political Methodology Section  
Discussant, 2014 Political Methodology Conference (University of Georgia)  
Section Chair, 2012 MPSA (Chicago, IL), Political Geography Section.  
Discussant, 2011 MPSA (Chicago, IL) “Presidential-Congressional Interaction.”  
Discussant, 2008 APSA (Boston, MA) “Congressional Appropriations.”  
Chair and Discussant, 2008 MPSA (Chicago, IL) “Distributive Politics: Parties and Pork.”

**Conference Presentations and Working Papers:**

“Ideological Representation of Geographic Constituencies in the U.S. Bureaucracy,” (with Tim Johnson). 2017 APSA.

“Incentives for Political versus Technical Expertise in the Public Bureaucracy,” (with Tim Johnson). 2016 APSA.

“Black Electoral Geography and Congressional Districting: The Effect of Racial Redistricting on Partisan Gerrymandering”. 2016 Annual Meeting of the Society for Political Methodology (Rice University)

“Racial Gerrymandering and Electoral Geography.” Working Paper, 2016.

“Does Deserved Spending Win More Votes? Evidence from Individual-Level Disaster Assistance,” (with Andrew Healy). 2014 APSA.

“The Geographic Link Between Votes and Seats: How the Geographic Distribution of Partisans Determines the Electoral Responsiveness and Bias of Legislative Elections,” (with David Cottrell). 2014 APSA.

“Gerrymandering for Money: Drawing districts with respect to donors rather than voters.” 2014 MPSA.

“Constituent Age and Legislator Responsiveness: The Effect of Constituent Opinion on the Vote for Federal Health Reform.” (with Katharine Bradley) 2012 MPSA.

“Voter Partisanship and the Mobilizing Effect of Presidential Advertising.” (with Kyle Dropp) 2012 MPSA.

“Recency Bias in Retrospective Voting: The Effect of Distributive Benefits on Voting Behavior.” (with Andrew Feher) 2012 MPSA.

“Estimating the Political Ideologies of Appointed Public Bureaucrats,” (with Adam Bonica and Tim Johnson) 2012 Annual Meeting of the Society for Political Methodology (University of North Carolina)

“Tobler’s Law, Urbanization, and Electoral Bias in Florida.” (with Jonathan Rodden) 2010 Annual Meeting of the Society for Political Methodology (University of Iowa)

“Unionization and Presidential Control of the Bureaucracy” (with Tim Johnson) 2011 MPSA.

“Estimating Bureaucratic Ideal Points with Federal Campaign Contributions” 2010 APSA. (Washington, DC).

“The Effect of Electoral Geography on Pork Spending in Bicameral Legislatures,” Vanderbilt University Conference on Bicameralism, 2009.

“When Do Government Benefits Influence Voters’ Behavior? The Effect of FEMA Disaster Awards on US Presidential Votes,” 2009 APSA (Toronto, Canada).

“Are Poor Voters Easier to Buy Off?” 2009 APSA (Toronto, Canada).

“Credit Sharing Among Legislators: Electoral Geography’s Effect on Pork Barreling in Legislatures,” 2008 APSA (Boston, MA).

“Buying Votes with Public Funds in the US Presidential Election,” Poster Presentation at the 2008 Annual Meeting of the Society for Political Methodology (University of Michigan).

“The Effect of Electoral Geography on Pork Spending in Bicameral Legislatures,” 2008 MPSA.

“Legislative Free-Riding and Spending on Pure Public Goods,” 2007 MPSA (Chicago, IL).

“Free Riding in Multi-Member Legislatures,” (with Neil Malhotra) 2007 MPSA (Chicago, IL).

“The Effect of Legislature Size, Bicameralism, and Geography on Government Spending: Evidence from the American States,” (with Neil Malhotra) 2006 APSA (Philadelphia, PA).

**Reviewer Service:**

American Journal of Political Science  
American Political Science Review  
Journal of Politics  
Quarterly Journal of Political Science  
American Politics Research  
Legislative Studies Quarterly  
State Politics and Policy Quarterly  
Journal of Public Policy  
Journal of Empirical Legal Studies  
Political Behavior  
Political Research Quarterly

Political Analysis  
Public Choice  
Applied Geography